

Very low- p_T di-muon production in peripheral Au+Au collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV at STAR

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Abstract

1 The strong electromagnetic field generated by the colliding nuclei in heavy-
2 ion collisions can be represented by a spectrum of photons, leading to photon-
3 induced interactions. While such interactions are traditionally studied in ultra-
4 peripheral collisions (UPC) without any nuclear overlap, significant enhancements
5 of dilepton pair and J/ψ production at very low transverse momentum (p_T) above
6 the expected hadronic interaction yields have been observed experimentally. The
7 observed excess yields exhibit a much weaker centrality dependence compared to
8 the hadronic production and are consistent with photon-induced interactions. The
9 measurements of very-low- p_T particle production in peripheral heavy-ion collisions
10 provide a unique opportunity to study photoproduction in heavy-ion collisions with
11 well-defined and smaller impact parameters compared to that in UPC.

12 In 2014 and 2016, the STAR experiment recorded large samples of Au+Au colli-
13 sions at $\sqrt{s_{\text{NN}}} = 200$ GeV. In this presentation, we will present new measurements
14 of very-low- p_T dilepton and J/ψ production in peripheral Au+Au collisions via the
15 $\mu^+\mu^-$ channel using these datasets. The dimuon channel provides complementary
16 measurement to the previous dielectron results and improves the precision. Dis-
17 tributions of invariant mass, p_T^2 and angular modulation will be shown. Physics
18 implications will also be discussed together with model comparisons.